

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:) A POWER TRANSMISSION BELT
SOKICHI NOSAKA ET AL) HAVING A MARK THEREON AND A
) METHOD OF PROVIDING A MARK ON
) A POWER TRANSMISSION BELT
Ser. No.: 09/772,137)
Filed: 1/29/01) Examiner: Marcus Charles
) Art Unit: 3682

APPELLANT'S BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Sir:

Real Party in Interest

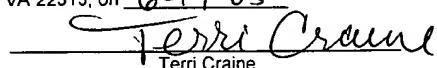
The real party in interest is Mitsubishi Belting Ltd., the assignee of all right, title and interest in and to the above-identified invention.

Related Appeals and Interferences

There are no appeals or interferences, known to Appellant, or Appellant's legal representative, which will directly affect, or be directly affected by, or have a bearing on, the Board's decision in this appeal.

37 CFR 1.8
CERTIFICATE OF MAILING

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Status of Claims

Claims 1, 4-7, 9-35 and 38-41 are currently pending in the application. Claims 21-35 have been withdrawn from consideration. The June 3, 2005 rejection of claims 1, 4-7, 9-20 and 38-41 is appealed herein.

Summary of the Invention

The claimed invention is directed to a method of providing a mark on a power transmission belt. The power transmission belt may take any of a number of different forms, among which are: a) a double, V-ribbed belt 10 as shown in Fig. 1 and described in Appellant's specification on page 6, beginning at line 14, through page 7, line 6; b) a flat belt 70, as shown in Fig. 4 and described in Appellant's specification on page 13, lines 10-18; c) a cog belt 90, as shown in Fig. 5 and described in Appellant's specification beginning at page 13, line 19, through page 15, line 15; d) a V-ribbed belt 126, as shown in Fig. 6 and described in Appellant's specification on page 15, at lines 16-24; and e) a V-belt 140, as shown in Fig. 7 and described in Appellant's specification on page 16, lines 1-6.

Each of the above power transmission belts has a body with oppositely facing side surfaces: a) side surfaces 34, 36 on the body 12 for the belt 10, as shown in Fig. 1, are described in Appellant's specification on page 7, lines 7 and 8; b) side surfaces 82, 84 on the body 72 of the belt 70, shown in Fig. 4, are described in Appellant's specification on page 13, lines 13-15; c) side surfaces 106, 108 on the body 92 on the belt 90, shown in Fig. 5, are described in Appellant's specification on page 14, lines 1-4; d) side surfaces 120, 122 on the body 124 on the belt 126, shown in Fig. 6, are described in Appellant's

specification on page 15, lines 16-18; and e) side surfaces 144, 146 on the body 142, on the belt shown in Fig. 7, are described in Appellant's specification on page 16, lines 1-3.

The method of providing a mark may be practiced in substantially the same manner, regardless of the form of the belt. The mark is applied to the belt body side surfaces, as also described above. For purposes of explanation herein, the method will be described only with respect to providing the mark 32 on the exemplary belt 10, shown in Fig. 1.

The nature of the mark 32 is not limited and may convey virtually any type of information desirable to be placed upon a power transmission belt. The designation "ABC" in Fig. 1 is intended to be a generic showing of this type of information (see Appellant's specification page 7, lines 7-14).

The body 12 of the V-ribbed belt 10 has an inside 14 and an outside 16. The body 12 further has a cushion rubber layer 22 with at least one load carrying member 24 embedded therein (see Fig. 1 and Appellant's specification page 6, lines 14-20).

Laterally spaced, triangularly-shaped ribs 28, 30 are provided on the inside and outside of the belt body 12 (see Fig. 1 and Appellant's specification page 6, line 22 through page 7, line 6). As seen in Fig. 1, the ribs 28, 30 are each triangularly-shaped to engage in complementarily-shaped pulley grooves (not shown) such that the angled portions on the side surfaces 34, 36 on the ribs 28, 30 directly engage facing pulley surfaces.

The mark 32, in the form shown in Fig. 1, extends sufficiently in an inside and outside direction that it is applied to the portions of the ribs 28, 30 that directly engage the cooperating pulley (see also Appellant's specification page 7, in the first full paragraph, as amended in Amendment "A" filed on July 25, 2003).

The mark 32 is applied directly on at least one of the side surfaces 34, 36 to directly alter that side surface(s) 34, 36 (see Fig. 1 and Appellant's specification page 7 in the first full paragraph, as amended in Amendment "A", filed on July 25, 2003). More specifically, this alteration is effected by inscribing the side surface 34, 36 to a depth of from 0.1 to 1 mm. The inscribing is preferably carried out through laser beam irradiation (see Appellant's specification page 7, line 15). By using a laser beam 42, a small part of a rubber component and potentially fibers in the load carrying cords 24 are vaporized so as to form depressions 38 (see Fig. 1 and Appellant's specification page 9, lines 1-4).

After the depression is formed, a material, contrasting in color with the portion of the side surface at which the depression is formed, is applied in the depression 38 to highlight the mark 32 (see Appellant's specification page 10, lines 4-12).

In one form, a depression 38 is formed at least partially directly in the load carrying cord 24 (see Appellant's specification page 8, lines 4-6).

The laser operation can be performed with the belt 10 in a fixed position (see Figs. 2 and 3 and Appellant's specification page 8, lines 19 and 20). The laser beam angle of reflection can be adjusted using at least one scanning mirror 52, 54 (see Fig. 2 and Appellant's specification page 8, lines 16-18).

ISSUES

Issue No. 1

Whether claims 1, 9 and 41 are obvious under 35 USC §103 over U.S. Patent No. 6,103,349 (Matsumoto) in view of U.S. Patent No. 4,997,994, to Andrews et al (Andrews).

Issue No. 2

Whether claims 4-7, 10-20 and 38-40 are obvious under 35 USC §103 over Matsumoto in view of Andrews, and further in view of Japanese Patent Publication No. 10252833 (Japan '833).

GROUPING OF CLAIMS

The claims in each of the two groups of claims, set forth above, do not stand or fall together.

ARGUMENT

Issue 1

Claim 1 is directed to a method of providing a mark on a power transmission belt having a body with a length and exposed, laterally spaced side surfaces. The side surfaces include portions to engage a cooperating pulley. The method includes the step of forming a mark directly on the at least one laterally spaced side surface by inscribing the at least one laterally spaced side surface to a depth of from 0.1 to 1 mm. Further, at least a part of the mark is formed directly on at least one of the portions of at least one of the laterally spaced side surfaces that engages a cooperating pulley.

In ¶3 of the Action, the Examiner argues that Matsumoto discloses that the marking (3) therein may be provided “over the entire belt side surface, indicating that the making [sic] may be provided unto the belt-engaging portion” (page 2, last two lines). To support this, the Examiner refers to column 4, lines 5 and 6 of Matsumoto, which describe that the hiding layer 4 may be provided “over the entire belt side face”. However, Matsumoto

defines the “belt side face” to exclude that portion which engages a pulley. More specifically, as stated in column 3, lines 46-48 of Matsumoto, “the side face ... is a surface of the belt body 1 other than the bottom face as a contact surface in contact with the pulleys...”. The “bottom face” is defined in the sentence there preceding as the “contact surface” (see column 3, line 45). Thus, the “side face” expressly excludes the “contact surface” portion that contacts a cooperating pulley.

Matsumoto consistently teaches away from placing the mark on any surface that contacts a pulley. Some examples thereof are identified below.

In column 1, beginning on line 66 and continuing through column 2, line 3, it is stated: “[t]o attain the above object, in the present invention, a mark indicating the history of belt manufacturing is placed not on a surface of the belt in contact with pulleys, such as the belt back face, but on a surface of the belt not in contact with the pulleys ...” (our emphasis).

In column 2, at lines 15-17, it is stated: “the mark indicating the history of belt manufacturing is provided on a surface of the belt other than the contact surface in contact with the pulleys, that is, on a surface of the belt that causes no contact and no friction with the pulleys...” (our emphasis).

In the Description of Preferred Embodiments, in column 3, lines 61-63, it is stated “the history of belt manufacturing is placed on the belt side face not in contact with the pulleys”.

In the single independent claim, Matsumoto recites that the identifying mark is “disposed on the non-contact portion of the at least one side face”.

Aside from teaching away from the specific limitation in Appellant's claim 1 that a part of the mark extends to a portion of a side surface that contracts a cooperating pulley, Matsumoto does not teach or suggest inscribing to any depth on a side surface of a belt. Substantially the entirety of Matsumoto's description concerns the application of the mark 3 using a separately added hiding layer 4, which is applied to a non-contact surface.

The Examiner has not cited any prior art which teaches to directly alter the side surface of a belt through depression-forming inscription. Appellant submits that the total absence of such an alteration is consistent with the industry's belief that the side surfaces of power transmission belts should not be inscribed to any depth, for fear of adversely affecting operating characteristics of the belt. The Appellant has determined that inscription to the depth in the recited range does not appreciably affect the performance of the belts or their life expectancy. At the same time, the mark tends to remain intact to identify potentially useful information after a substantial period of belt running.

Matsumoto, as an alternative to depression-forming inscription, teaches mark application through the use of the hiding layer 4, for the preferred embodiment. The hiding layer is not the same as an inscription, but rather, is an addition to the side surface, and thereby represents no alteration as claimed to the side surfaces of the belt.

As an alternative to using a hiding layer, Matsumoto makes passing reference to the application of the mark directly upon the belt side surface. In column 4, lines 8-12, Matsumoto states that "in the case that the mark 3 can be sufficiently read without the hiding of the belt texture, for example, when the cord is not embedded or the mark 3 has larger letters, the mark 3 can be directly provided on the belt side face without using the

hiding layer 4". However, this statement does not suggest inscription to any depth on the belt side surfaces.

The inscription to the depth recited in Appellant's claim 1 potentially allows legibility even when the mark is applied over a load carrying cord or elsewhere wherein there is "texture" that might obstruct the ability to see basic "printing", as taught in Matsumoto.

The Examiner relies upon Andrews for the disclosure therein of inscription of an element to the claimed depth. It is respectfully submitted that Andrews' teachings are not obviously combinable with Matsumoto's. Matsumoto is concerned with a power transmission belt having primarily rubber and fibrous components in a dynamic environment. Andrews is concerned with marking "[a]n elongated material such as a cable" (see Abstract line 1). The cable 20 in Andrews characterized as having a jacket 32 made from a plastic material (see column 3, lines 56-63). The jacket 32 is homogeneous in construction and presumably is designed to function with the marking thereon in a static environment.

The significance of depth of inscription in a product, such as that disclosed in Andrews in a static environment, has little meaning in designing a belt in a dynamic environment that is subjected to bending and frictional forces in use. It is respectfully submitted that one skilled in the power transmission belt art would not look to the teachings in a static cable environment to determine whether inscription, or what depth of inscription, would be appropriate with respect to a belt side surface that is repeatedly bending and moving repetitively into and out of contact with a cooperating pulley. The difference in composition of the materials on the jacket in Andrews versus the side surfaces in

Matsumoto i.e. homogeneous plastic or rubber and fiber components, makes the combination even less obvious and more inappropriate.

Accordingly, claim 1 is believed allowable.

Claim 9

Claim 9 depends from claim 1 and characterizes the inscribing as forming a depression in one of the side surfaces and further recites the step of directing material into the depression, which material contrasts with the at least one of the laterally spaced side surfaces in which the depression is formed.

Since a) Matsumoto lacks any teaching of inscribing to any depth on a belt side surface and b) Andrews, which discloses a contrasting pigment filling in indentations on a cable, is not obviously combinable with Matsumoto, the claimed additional step of adding contrasting material to the depression further distinguishes over Matsumoto, thereby potentially providing a more clearly visible mark in the gelt environment.

Claim 41

Claim 41 is directed to a method of providing a mark on a power transmission belt having a body with spaced side surfaces, including a cushion rubber layer with at least one load carrying member embedded therein, and a tension layer. The method includes the step of altering at least one of the laterally spaced side surfaces by forming an informational mark directly on the at least one laterally spaced side surface by an inscribing process to a depth of 0.1 to 1 mm so that at least part of the mark is formed on the at least

one laterally spaced side surface in the tension layer and on the at least one load carrying member on the at least one laterally spaced side surface.

As noted above, Matsumoto does not teach or suggest any alteration of a belt side surface through depression-forming inscription. As further noted above, the lack of citation of any prior art that alters the belt side surface by inscription to any depth to produce a mark is indicative of the fact that the industry has purposely avoided any such alteration of side surfaces of belts. Appellant has found that side surface alteration is possible, within the stated parameters, without having a significant adverse effect on the operating characteristics of the belt. By being able to directly inscribe the load carrying member to a depth within the claimed range, the use of the hiding layer, as required in Matsumoto, is obviated and a mark can be produced even where the texture of the belt varies significantly.

It is also noted that claim 41 does not require the formation of any part of the mark on a side surface portion that engages a cooperating pulley. However, claim 41, in the absence of this requirement, distinguishes over the applied art. Claim 41 is thus believed allowable.

Issue No. 2

The remaining claims stand rejected based upon the combination of Matsumoto and Andrews, and further in view of Japan '833. Japan '833 is directed to the formation of a mark through a laser on a "belt back face" that is used as a "driving surface". Japan '833 does not teach or suggest the lasing of either side surface of a belt.

It is respectfully submitted that it is improper to combine the teachings of Japan '833 with Matsumoto and Andrews. Generally, the back face of a power transmission belt is defined by a fabric layer. Through the use of a laser, the surface appearance of the fabric can be altered to produce a contrast that allows the mark to be formed. Japan '833 relates to the Appellant's own technology. Appellant submits that the use of the laser, as in Japan '833 and on a "back face" of a belt, is a very different concept than using a laser on a pulley-engaging belt side surface.

The Appellant respectfully submits that the teachings of Matsumoto, Andrews and Japan '833, in combination, do not teach or suggest to one skilled in this art, the basic method steps recited in claim 38 or 40 or in base claim 1, from which claims 4-7 and 10-20 depend. As noted above, Matsumoto does not teach inscribing of a belt side surface to any depth. Japan '833 is not directed to any marking of a belt side surface. Andrews relates to lasing of a plastic sheet on a cable in a static environment that does not relate to the power transmission art. Accordingly, the remaining claims are believed allowable.

Claim 4

Claim 4 recites that the inscribing is performed using a laser beam. The prior art, taken individually or in combination, does not teach or suggest any type of inscription of a belt side surface to any depth, let alone use of a laser beam to effect this end.

Claim 5

Claim 5 characterizes the mark as inscribed with a laser beam with an angle of reflection that is adjusted using at least one scanning mirror. Since the art does not teach or suggest inscribing side surfaces of a belt using a laser beam, the further limitation relating to control of the laser beam further distinguishes over the prior art.

Claims 10, 11, 18-20

Claims 10, 11 and 18-20 each require that the mark is inscribed with a laser beam with the belt body maintained in a stationary position. Only Japan '833 relates to the use of a laser beam to treat any part of a power transmission belt. Japan '833 teaches that the belt being lased is placed on a movable support stand which is shifted relative to the laser beam. Aside from the fact that it would not be obvious to combine Japan '833 with Matsumoto and Andrews, even in combination this limitation is not met.

Claims 6 and 12-14

Claims 6 and 12-14 relate to a specific configuration of belt. Appellant submits that these claims are allowable by reason of the limitations in independent claim 1, on which they are based.

Claims 7 and 15-17

Each of claims 7 and 15-17 recites the formation of a depression and the direction of material into the depression to contrast and highlight the mark. The

significance of this limitation is set out in the arguments advanced relative to the allowability of claim 9.

Claim 38

Claim 38 recites a method of providing a mark on a power transmission belt having a body with a length and laterally spaced side surfaces. Each side surface has a portion to engage a cooperating pulley. The method includes the step of altering at least one of the laterally spaced side surfaces by forming an informational mark directly on the at least one laterally spaced side surface by an inscribing process to a depth of 0.1 to 1 mm at least partially on the portion of the at least one laterally spaced side surface.

The arguments advanced relative to the allowability of claim 1 apply equally to claim 38. Notably, it would not be obvious to combine the teachings of Andrews with Matsumoto to inscribe a side surface of the belt to any depth, let alone that stated, to produce an informational mark.

Japan '833 adds little to support the rejection in that claim 38 does not expressly recite the use of a laser. Japan '833 does not teach alteration of a belt side surface. Thus, in combination, the three cited references do not make obvious the alteration of a belt side surface ,as through inscription to the claimed depth.

Claim 39

The arguments advanced relative to the allowability of claim 9 apply equally to claim 39.

Claim 40

Claim 40 recites a method of providing a mark on a power transmission belt having a body with a length and exposed laterally spaced side surfaces. The method comprises the steps of altering at least one of the side surfaces by forming a mark directly thereon through inscribing to a depth of 0.1 to 1 mm with a laser beam. The laser beam forms a depression into which contrasting material is provided.

Claim 40 includes limitations, described with respect to claims 1 and 38, that are not taught or suggested by the cited art, particularly the inscribing of the side surface to a depth of 0.1 to 1 mm. Claim 40 additionally characterizes the mark as being inscribed using a laser beam.

Andrews is relied upon for the disclosure of the use of a laser beam to inscribe a surface. However, Andrews' lasing step is performed on a homogeneous plastic layer, apparently to a depth significantly less than the radial thickness of that layer. This is a different concept than lasing the side surface of a belt at which there is a combination of fibrous load carrying cords or layers and rubber, as well as potentially other components.

Japan '833 teaches lasing of a back surface of a belt, which is typically defined by a fabric layer. Japan '833, Appellant's own prior art, does not hint at the idea of lasing side surfaces of a belt.

As Appellant notes on page 9 in the first full paragraph of Appellant's specification, it has been found that using a laser beam to the depth claimed causes an instantaneous melting of only a small part of the rubber as well as potentially fibers in the load carrying cords to produce a visible mark without significantly adversely altering

the structure of the belt. Appellant respectfully submits that while lasing of surfaces to facilitate printing is known, the lasing of a homogeneous layer, such as that in Andrews on a product in a static environment, or a fabric layer on a back surface as in Japan '833, would not motivate one skilled in this art to lase a side surface of a belt that has potentially several different compositions and components.

To the extent that the limitations overlap, the arguments advanced relative to the allowability of claims 9 and 38 likewise apply to claim 40.

Claim 40 does not require that the mark, or any part thereof, be provided on pulley contacting side surface portions. However, without that limitation, claim 40 distinguishes over the combination of Matsumoto, Andrews and Japan '833 and is believed allowable.

CONCLUSION

It is respectfully submitted that the absence of the teaching in any prior art reference cited of inscribing a side surface of a belt to any depth in applying a mark, in the very crowded power transmission belt art, supports the unobviousness of the claimed invention. It is submitted that the art applied by the Examiner does not teach or make obvious any alteration through depression-forming inscription of a belt side surface, without using Appellant's teachings as a template and impermissibly relying on hindsight.

Accordingly, it is respectfully requested that the Board reverse the Examiner's rejection of claims 1, 4-7, 9-28 and 38-41.

Respectfully submitted,

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APPENDIX

1. A method of providing a mark on a power transmission belt having a body with a length and exposed laterally spaced side surfaces, including portions to engage a cooperating pulley, said method comprising the step of:

forming a mark directly on the at least one laterally spaced side surface by inscribing the at least one laterally spaced side surface to a depth of 0.1 to 1 mm and so that at least a part of the mark is formed directly on at least one of the portions of at least one of the laterally spaced side surfaces.

2.-3. (cancelled)

4. The method of providing a mark on a power transmission belt according to claim 1 wherein the mark is inscribed with a laser beam.

5. The method of providing a mark on a power transmission belt according to claim 4 wherein the mark is inscribed with the laser beam with an angle of reflection that is adjusted using at least one scanning mirror.

6. The method of providing a mark on a power transmission belt according to claim 4 wherein the body comprises an inside and an outside, and the power transmission belt comprises a double V-ribbed belt comprising laterally spaced ribs extending lengthwise of the body on the inside and outside of the body, a cushion rubber layer, and at least one load carrying member in the cushion rubber layer and extending lengthwise with respect to the body.

7. The method of providing a mark on a power transmission belt according to claim 4 wherein the laser beam forms a depression in the at least one of the laterally spaced side surfaces and further comprising the step of directing a material into the depression, which material contrasts with the at least one of the laterally spaced side surfaces.

8. (cancelled)

9. The method of providing a mark on a power transmission belt according to claim 1 wherein the inscribing forms a depression in the at least one of the laterally spaced side surfaces and further comprising the step of directing a material into the depression, which material contrasts with the at least one of the laterally spaced side surfaces.

10. The method of providing a mark on a power transmission belt according to claim 4 wherein the mark is inscribed with a laser beam with the body maintained in a stationary position.

11. The method of providing a mark on a power transmission belt according to claim 6 wherein the mark is inscribed with a laser beam with the body maintained in a stationary position.

12. The method of providing a mark on a power transmission belt according to claim 4 wherein the power transmission belt comprises a V belt.

13. The method of providing a mark on a power transmission belt according to claim 4 wherein the power transmission belt comprises a cog belt with teeth spaced lengthwise of the body.

14. The method of providing a mark on a power transmission belt according to claim 4 wherein the body comprises an inside and an outside and there are flat surfaces on the inside and outside of the body.

15. The method of providing a mark on a power transmission belt according to claim 12 wherein the laser beam forms a depression in the at least one of the laterally

spaced side surfaces and further comprising the step of directing a material into the depression, which material contrasts with the at least one of the laterally spaced side surfaces.

16. The method of providing a mark on a power transmission belt according to claim 13 wherein the laser beam forms a depression in the at least one of the laterally spaced side surfaces and further comprising the step of directing a material into the depression, which material contrasts with the at least one of the laterally spaced side surfaces.

17. The method of providing a mark on a power transmission belt according to claim 14 wherein the laser beam forms a depression in the at least one of the laterally spaced side surfaces and further comprising the step of directing a material into the depression, which material contrasts with the at least one of the laterally spaced side surfaces.

18. The method of providing a mark on a power transmission belt according to claim 12 wherein the mark is inscribed with a laser beam with the body maintained in a stationary position.

19. The method of providing a mark on a power transmission belt according to claim 13 wherein the mark is inscribed with a laser beam with the body maintained in a stationary position.

20. The method of providing a mark on a power transmission belt according to claim 14 wherein the mark is inscribed with a laser beam with the body maintained in a stationary position.

36.-37. (cancelled)

38. A method of providing a mark on a power transmission belt having a body with a length and exposed laterally spaced side surfaces, each said side surface including a portion to engage a cooperating pulley, said method comprising the step of:

altering at least one of the laterally spaced side surfaces by forming an informational mark directly on the at least one laterally spaced side surface by an inscribing process to a depth of 0.1 to 1 mm at least partially on the portion of the at least one laterally spaced side surface.

39. The method of providing a mark on a power transmission belt according to claim 38 wherein the inscribing process defines a depression and further comprising the step of directing a material into the depression, which material contrasts with the at least one of the laterally spaced side surfaces.

40. A method of providing a mark on a power transmission belt having a body with a length and exposed laterally spaced side surfaces, said method comprising the steps of:

altering at least one of the laterally spaced side surfaces by forming a mark directly on the at least one laterally spaced side surface,

wherein the step of forming a mark on the at least one laterally spaced side surface comprises inscribing the mark on the at least one laterally spaced side surface,

wherein the mark is inscribed to a depth of 0.1 to 1 mm,

wherein the mark is inscribed with a laser beam,

wherein the laser beam forms a depression in the at least one of the laterally spaced side surfaces; and

directing a material into the depression, which material contrasts with the at least one laterally spaced side surface.

41. A method of providing a mark on a power transmission belt having a body with a length, exposed laterally spaced side surfaces, a cushion rubber layer within

which at least one load carrying member is embedded, and a tension layer, said method comprising the step of:

altering at least one of the laterally spaced side surfaces by forming an informational mark directly on the at least one laterally spaced side surface by an inscribing process to a depth of 0.1 to 1 mm so that at least a part of the mark is formed on the at least one laterally spaced side surface in the tension layer and on the at least one load carrying member at the at least one laterally spaced side surface.